

The Need of Green Open Spaces as the Effect of Urban Waterfront Development in Sungai Bilu, a Stream Corridor Neighbourhood in Banjarmasin

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Abstract. Banjarmasin which is known as “the thousands river city” has a very close relationship with the waterfront. However, the pressure to upgrade the quality and quantity of urban areas has urged the local government to do some new projects by sacrificing some natural city elements. This has transformed Banjarmasin’s urban waterfront and rivers in many ways. This study conducted to know the effect of urban waterfront development in forming the green space in a stream corridor neighbourhood. For this purpose, green neighbourhood elements have been used to indicate: how the waterfront development has affected the neighbourhood; the respond of local residents of the urban waterfront development; and as the result is the urgent need of green spaces in the neighbourhood of stream corridors. The contents of these indicators are illustrated by analysing a stream corridor neighbourhood in Banjarmasin called Sungai Bilu. This article was based on post evaluation and underlying ideas of how the urban waterfront transformation has affected the need of public green open spaces in the neighbourhoods. Keywords: waterfront development, green open space, stream corridor, local residents.

1 Introduction

Urban waterfront development has a significant role in shaping the green space and neighbourhood of the city and public life. Its elements such as available land, clean water and urban revitalization that based on sustainable development showed how those city resources can be integrated into a spatial planning process[1–3]. Stream corridor as the location of waterfront development holds an important role to set the river stream and mineral that came from its surroundings and also as the passage to vegetation and animals [4]. The urban stream corridor is part of the watershed and blue open water area which accommodated the microhabitat system. It can be natural or man-made, such as forest, agricultural field, rural areas, etc. Vegetation that sufficient for a stream corridor can affect and protect the corridor as sun shading, controlling the quality of water, and prevent erosion.

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Banjarmasin as the thousands river city has a very close relationship with stream corridor. The neighbourhood along stream corridor in Banjarmasin was built above the river since the colonial era [5,6]. The local Government of Banjarmasin committed to making Banjarmasin as the city of thousand rivers which is safe, comfortable, and attractive to support the social, tourism and trading activity by maintaining the sustainable development[7,8]. The local government put high expectation through the waterfront development to open possibilities for waterfront tourism in the future.

The pressure to upgrade the quality and quantity of urban areas has urged the local government to do some upgrading projects in the stream corridor neighbourhood by sacrificing some city's natural elements, including green spaces. These new waterfront development projects have transformed Banjarmasin's stream corridor neighbourhood in many ways and affecting mostly the element of the environment and social activity of local residents [5,6]. Generally, waterfront development often put fewer concerns to the loss of natural elements, green spaces, local history, culture and identity of the stream corridor neighbourhood[2,5,6,9,10].

As part of the stream corridor neighbourhood, green open space has the main function as the foundation of the natural environment of an area[11]. Basically, the availability of green space can control and maintain the integrity and the quality of environment [12]. Public green open space includes parks, sports facilities, gardens, street trees and nature conservation areas which should be provided at least 30% of each city area[13,14]. Urban green spaces is an important element of urban ecosystem and links directly to the quality of the neighbourhood in the city and also preserving biodiversity and many important elements in urban areas[15]. Green spaces in the stream corridor neighbourhood will create a green neighbourhood and the improvement of environmental quality.

The arrangement of public and private green open spaces that based on the awareness of environment and neighbourhood is a good planning approach that can be used to control the quality of settlements/dwelling in stream corridors [12,16,17]. In the end, green open spaces in a neighbourhood might lead to improving the quality of space, cleanliness, reducing slums and help to increase the awareness of local residents to their own neighbourhood. In some other case studies of waterfront development, it is also often happened that the local residents of the area tends to globalised development of the waterfront and urged the need for urban spaces and activities[3,18,19]. The attitude toward the environment also related to the environmental concern's level of the local residents [20]. This means the awareness of the local residents to their environment and surrounding area affects the need for green space in the neighbourhood.

2 Research Methodology

To achieve a better point of view the urban waterfront redevelopment in Sungai Bilu, fieldwork in the area has been undertaken by the authors since the year 2016. The research includes the land use plot of all settlements along the waterfront (2016-2018), in-depth interviews (conducted in 2016, 2017 and updated in early 2018) with 50 local people/residents who were born/live there more than 15 years. From the planner's perspectives, we interviewed officials from Banjarmasin Municipality, and South Borneo Indonesia Planner Association (IAP). We also analysed the publications of City Planning and tourism authorities in Banjarmasin and speeches of government officials, especially from the Mayor of Banjarmasin and the Chief or "*Pembakal*" of Kelurahan Sungai Bilu regarding their emphasis in urban waterfront as one of the way in reclaiming the city.

In this research, the guidelines for green neighbourhood were derived from the concept of green city as the legal document in Indonesia that provides 8 main elements of green city in Indonesia [21], which are: green planning and design; green open space; green water;

green waste; green energy; green transportation; green community and green building. This concept of a green city and green neighbourhood consider as new approaches for planning and developing cities all over the world such as in European cities, Asian Cities and Middle Eastern Cities [22,23].

To determine how the urban waterfront redevelopment has been well received by end users, interviews with local people who were born or has lived along the waterfront for more than 15 years were conducted in early 2018. Interviews and questionnaires were done on site with 50 local people. They were asked about the effect of urban waterfront development in their neighbourhood based on the elements of a green neighbourhood, how their attitudes towards the *Kampung Hijau* Project, and how the changes have impacted them. The wide variety of public involvement in this project allows us to acknowledge the responses of local people towards the urban waterfront development.

3 Kampung Hijau: Urban Waterfront Development in Sungai Bilu

Sungai Bilu is one of the districts in East Banjarmasin which is known with its waterfront. The local residents have lived above its stream corridor for more than 40 years and this has been proofed by the 1970's Banjarmasin map and interviews that have been conducted. Almost all of the settlements are constructed above the river and this neighbourhood actually part of the indigenous culture of Banjarmasin. There are a lot of cultural activities that are part of the local heritage and remains unaffected by time.

Kampung Hijau Project started in 2017 and it was preceded by the development of some kind of promenade in 2016 made from concrete materials that replace the old wood promenade along the Sungai Bilu stream corridor. The development was piloted by the Governor of South Borneo, while the Kampung Hijau Project was developed by Banjarmasin's local Government. Kampung Hijau itself translated as "Green Neighbourhood". The aim of the project is to improve the quality of the neighbourhood by applying green neighbourhood guidelines.

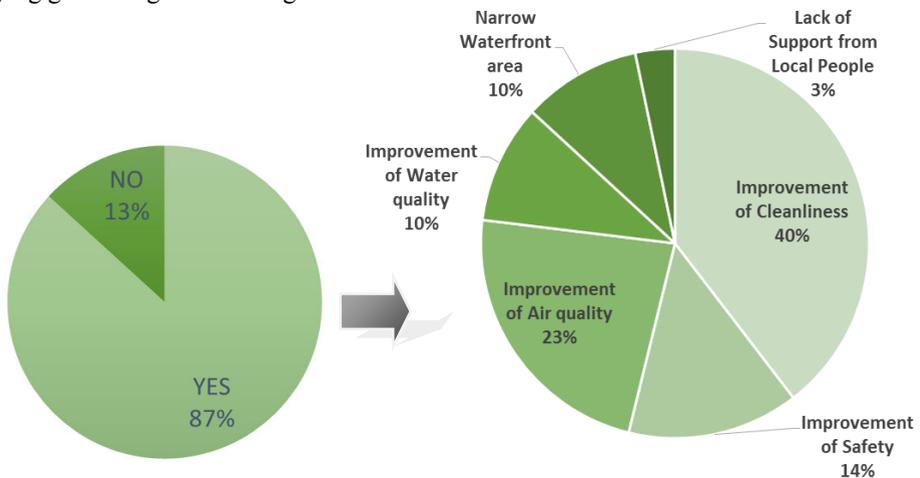


Fig. 1. How Local Residents See the positive and negative Effect of Waterfront Development/Kampung Hijau in their Neighbourhood?. Source: Local Interview, 2018.

Overall, Kampung Hijau project as the urban water development offered a new identity to Sungai Bilu. The project consists of some program. The first one is the rehabilitation of the settlements along the stream corridor. The local government fixed the local resident's dwelling which was in bad condition. They installed new walls and roof material painted in

a green colour scheme. This has created a cleaner environment and transformed the face of the neighbourhood that used to look like slum area into a new modest area.

Nevertheless, from the 8 elements of a green neighbourhood, Sungai Bilu still considered being unestablished to fulfil all of the elements. From those elements, there are three of them that already implemented in Sungai Bilu, which are green energy (the use of solar panel light), green water (the use of bio pore septic tank) and green space (the additional of plantation). The solar panel has a huge contribution in lighting the area at night while conserving energy. The use of bio pore septic tank also helps improve the cleaner environment. The local residents use to have traditional toilets that connect directly to the stream beneath their settlements. Bio pore septic tank was first introduced to the area around 2015 and continue until now. It can be seen from Figure.1 that from 87% of the local resident agree Kampung Hijau/Green Neighbourhood waterfront development project has given some positive impacts to the neighbourhood, which are: the improvement of cleanliness; improvement of neighbourhood's security; improvement of air quality; and improvement of water quality.



Fig. 2. Kampung Hijau Sungai Bilu, a stream corridor neighbourhood

As for the green space element, Kampung Hijau project added some plantation as an effort to make a greener neighbourhood. However, the lack of available land in Sungai Bilu for green space has made the authors focused the research on green space of the neighbourhood.

3.1 Green Open Space in Sungai Bilu after Kampung Hijau Project

In the case of Sungai Bilu, almost all of the housing area is located above the river stream, it is almost impossible to install available land into every single house in order to create private green space. Sungai Bilu also cannot be categorized into the stream corridor green space, because normally the green space in stream corridor are considered as the green belt on both sides of the river stream corridor that has the main function to protect the river from environmental degradation. Sungai Bilu neighbourhood is built directly above the river just

like other stream corridor neighbourhood in Banjarmasin. Regarding this, the Municipality of Banjarmasin has made a new regulation that stated every single stream corridor settlements/neighbourhood in Banjarmasin are protected by law and cannot count as part of the river's boundary. The stream corridor neighbourhoods are part of the local culture that needs to be protected, as the local Government of Banjarmasin intend to focus on the development of the river, especially the stream corridor.

According to the Green Open Space Guidelines [14], Sungai Bilu as a stream corridor neighbourhood might be categorized as a Non-Green Open Space/*Ruang Terbuka Non Hijau* which is specialized into Blue Open Space, while the type of vegetation in every private yard can be categorized as pot plants.

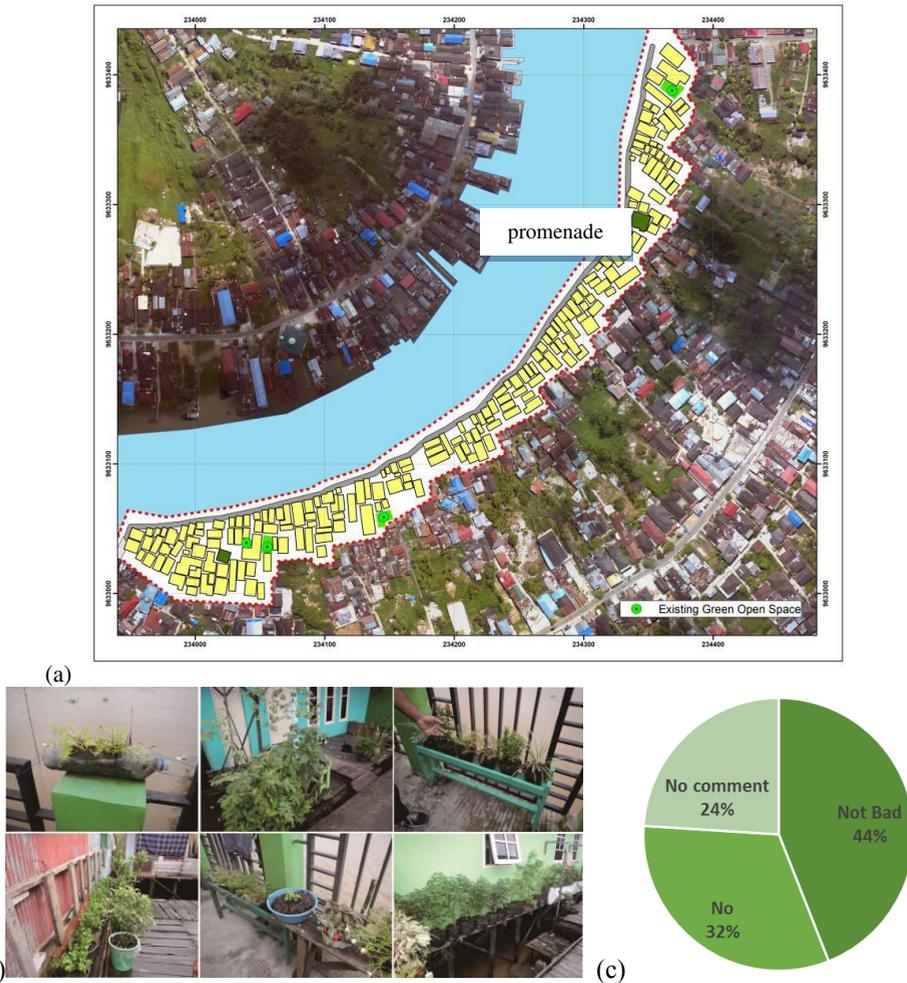


Fig. 3. (a)The Existing green open spaces in Sungai Bilu (b) Condition of Plantation in Sungai Bilu. (c) Does Sungai Bilu already has good green spaces in the Neighbourhood/waterfront area?. Source: Observation and Local Interview, 2018.

As can be seen from Figure.3 (b), there are only decorative plants that put in small pots and located in front of each of the local residents' house and also along the promenade of Sungai Bilu's neighbourhood. Obviously, each house should have at least a 10% green space area as part of the 30% area of public green space [7,14,21]. The lack of spaces has made this is almost impossible to be fulfilled. Therefore, the lack of spaces in Sungai Bilu

neighbourhood has made the most possible way to improve the green open space in the neighbourhood through the potted plants and even in forms of vertical garden or roof garden. These little efforts are counted as green open space under the Private yard category. As for the public green open spaces, there are none in the neighbourhood.

Total there are 74 single houses which have their private yard. The Kampung Hijau project provides each private yard with at least 5 potted plants and 3 hanging potted plants, mostly decorative plants. Some of the local residents also plant local fruit and vegetables such as celery, chillies, tomatoes, lime, and lemongrass. Those fruits and vegetables mainly used in Banjarmasin local food called *Soto Banjar*/Banjarese Soup which is a cultural heritage. The local residents also run some small culinary shops along the corridor.

It is true that plants might bring good vibes to the neighbourhood, but it is not enough to be called green spaces. During the daytime, local residents can still feel the rising temperature. It is almost impossible to plant big trees for sun shading in Sungai Bilu, this is because of the location of the waterfront. It's hardly possible to find land for planting big trees. Even for the private green space area, there is no land provided by each house. No big trees for sun shading consequently opened all the space to solar lights. Some of the local residents even move their potted plants to the side or back of their house to minimize direct contact with solar lights. As the environment and neighbourhood quality improved, the local residents now can feel the next thing that is still missing in their neighbourhood: public open spaces to do their social and cultural activities and bigger green space to improve their environmental quality.

3.2 The Need of Green Open Spaces for Social Activities in Sungai Bilu

Green open space in Sungai Bilu neighbourhood has a deep connection with its culture and traditions. The local residents love to socialize amongst each other. Almost all of the local residents are indigenous people of Sungai Bilu who already lived there for around 40 years. The river and the stream corridor has been part of their daily lives. The way they live and act mostly affected by the character of their neighbourhood. Back before the 2000s, all activities are centred to the river, such as bathing, swimming, washing clothes, and even the water transportation also was still active. The new waterfront development has changed some of the local residents' habits.

Table 1. Analysis of Existing and Proposed Green Open Spaces

No	Location of Existing Green Open Spaces	Existing Quantity of Green Open Spaces(m ²)	The quantity of Green Open Spaces (According to Standard in m ²) [14]	The quantity of Green Open Spaces (Required to achieve Standard in m ²)
1	RT I	25,705697	250	224
2	RT II	-	250	250
3	RT III	97,762852	250	152
4	RT IV	-	250	250
5	RT V	-	250	250

6	RT VI	109,930543	250	140
7	RT VII	134,69869	250	237
8	RT VIII	-	250	250
	TOTAL	246,868961	2.000	1.753

According to the Green Open Space Guidelines for green space in each *Rukun Tetangga* (RT)/local Neighbourhood, Sungai Bilu needs extra public spaces. Each RT requires around 250 m² per public space. Along the stream corridor, there are 8 neighbourhoods which means total around 2.000 m² spaces need to be provided in the neighbourhoods (see Table.1). Compared to the existing area, the neighbourhoods' need 1.753 m² green spaces in order to reach the standard quantity of green spaces. With the non-availability of the existing area, another approach for designing the neighbourhood is needed to achieve the goals.

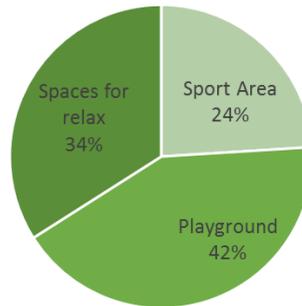


Fig. 4. The type of green spaces that are needed by the local resident in Sungai Bilu. Source: Analysis, 2018

The local residents need 3 types of open spaces: Playground; sports area; and space for relaxing (see Figure 4). The playground is needed because Sungai Bilu has so many children aged below 3 and those who are still in elementary school. At the moment, those children only use the small space available in the promenade to play, for example like kiting (see Figure.2). Maybe only the children who live in stream corridors have the skill to play kites in such limited spaces. The same thing also for the spatial need for relaxing. Sungai Bilu also has some elders that use to sit together and socialize. At the moment this activity also happens in the promenade area. For the sports area, the local residents seem to never doing any sporting activity in their neighbourhood, because the only thing that possible to do in their neighbourhood is jogging and swimming. Therefore, the local residents always facing problems regarding social activity that need extra spaces in the neighbourhood.

4 Conclusions

The urban waterfront development in Sungai Bilu through Kampung Hijau Project has given many effects in local resident's daily life through the project. Mostly it gives many positive improvements in environmental quality, as it is the main point of the project. From 8 elements of a green neighbourhood, Sungai Bilu has not successfully reached the goal of

each element. Some elements that already implemented in Sungai Bilu are green energy, green water, and green space in form of vegetation. The green space element as the main focus in this research can be seen from potted plants and hanging potted plants that provided in each private yard along the stream corridor and the promenade create a whole different new look and design of green spaces. The lack of spaces and land along the stream corridor neighbourhood have to be accommodated in different approaches. It is almost impossible to plant big trees directly on a land. Therefore, decorative plants, fruit and vegetable plants can be one of a solution in providing private green spaces in Sungai Bilu. The local residents also show a great awareness to green space, they manage to take care the potted plants daily through watering and using green media as their fertilizer. This means they are actively participating to form a green neighbourhood. The vegetation not only can make the neighbourhood greener but can also help to improve the environmental quality. In the future, new models of private green space can be developed for private yard in the neighbourhood of the stream corridor, such as a rooftop garden and green promenade. On the other hand, Sungai Bilu urgently needs public green open space to facilitate activities of the local residents. The Sungai Bilu's residents have the habit of sitting along the promenade and socialize with the other residents, mostly in the morning and in the evening such as chatting, playing chess or simply just enjoying the view of the river. Moreover, the local residents are so friendly and open to strangers, it would be good if there's a special space to accommodate their activities. The same thing also happen with the children activity, it is almost impossible for them to have a playground to play kite or even soccer.

Of course, the lack of land is the thread that should be solved for a stream corridor neighbourhood like Sungai Bilu. The local Government need to considerate to plan and develop green communal spaces or other facilities to overcome the need of public open space that might be located in the land part of the neighbourhood. The local residents should be involved since the first stage of the planning process, so the local Government can provide the right solution that accommodates the need of the local residents itself. Hopefully, if the green open space already built in the neighbourhood, Sungai Bilu would grow a more significant improvement in environmental quality while also providing spaces for social activity for the residents.

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